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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/581,133

05/30/2006

Rafat Ata Mustafa Hikmet

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS

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BRIARCLIFF MANOR, NY 10510

EXAMINER

ROY, SIKHA

ART UNIT

PAPER NUMBER

2879

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/581,133	<b>Applicant(s)</b> HIKMET ET AL.	
	<b>Examiner</b> Sikha Roy	<b>Art Unit</b> 2879	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,3,4,6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by US Pub 2003/0042850 to Bertrum et al.

Regarding claim 1 Bertrum discloses (para [0006] – [0009], [0023],[0025],[0029]) a method for improving electrical energy transfer from electroluminescent organic molecules to quantum dots embedded in the organic matrix material comprising the steps of providing a matrix 3 of organic molecules with embedded quantum dots, providing one or more transfer molecules (capping molecules) on the surface of the quantum dots, supplying electrons and holes to the matrix using first and second

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electrical contacts 2,4 in electrical contact with the organic matrix, generating excitons, and transferring excitons from EL organic molecule to transfer molecules on the quantum dots and transferring excitons from the transfer molecules to the quantum dots.

Regarding claim 3 Bertrum discloses the hole and electron processing means each comprising two layers hole injecting on the substrate and hole transporting and electron injecting and electron transporting on the top of light emitting layer, the electron and hole blocking (transporting) layers being adjacent to the matrix.

Regarding claims 4, 6 and 7 Bertrum discloses (para [0020]-[0025]) one or more transfer molecules comprising fluorine polymer, fluorine oligomer, the quantum dots comprising CdSe and EL organic molecules comprising poly(phenylene vinylene) or PPV. These compounds being same as those disclosed by the applicant it is anticipated that Bertrum discloses transfer molecules have a bandgap smaller than the bandgap of EL organic molecule and larger than the band gap of quantum dots, transfer rate of excitons from EL organic molecules to transfer molecules is larger than decay rate of excitons in EL organic molecules and transfer rate of excitons from transfer molecules to the quantum dots is larger than the decay rate of excitons in the transfer molecules.

Claim 8 essentially recites the same limitations as of claim 1 for quantum dot embedded organic molecule device and hence is rejected for the same reason.

Claim 9 essentially recites the same limitation as of claim 7 for the device and hence is rejected for the same reason.

Regarding claim 10 Bertrum discloses the EL organic molecules (PPV) are electroluminescent polymers.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pub 2003/0042850 to Bertrum et al., and further in view of US Pub 2004/0023010 to Bulovic et al.

Regarding claim 2 Bertrum does not explicitly disclose preparing the matrix from solution of organic molecules and quantum dots.

Bulovic in same field of endeavor of light emitting device including semiconductor nanocrystals discloses (para [0046]-[0048]) dispersing nanocrystals (quantum dots) in a solution of organic molecules (TPD) and thus forming matrix of organic molecules embedded with quantum dots. This method reduces the number of pinhole shots in the emissive layer.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to specify the method of providing the matrix of organic EL molecules embedded with quantum dot of Bertrum as forming solution of the organic molecule and

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the quantum dots as suggested by Bulovic for reducing the number of pinhole shots in the emissive layer.

Regarding claim 11 Bertrum and Bulovic disclose the method of fabricating light emitting quantum dot embedded organic device comprising the steps of providing a solution of EL organic molecules and solution of quantum dots with transfer molecules attached to the surfaces (transfer molecules : fluorine polymer , organic EL molecule: PPV and quantum dots: CdSe – having the same compositions as those disclosed by the applicant possess the band gaps such that  $E_{\text{transfer}} < E_{\text{org.mol.}}$  and  $E_{\text{transfer}} > E_{\text{QD}}$ ), mixing the solutions, providing first electrical contact and forming the matrix of organic EL molecules with embedded quantum dots on the first electrical contact and depositing the second electrical contact on the matrix.

Regarding claim 12, Bertrum discloses the process further comprises steps of forming between the matrix and the first/second electrode a material layer for enhancing hole transport.

Regarding claim 13, Bertrum discloses the process further comprises steps of forming between the matrix and the second/first electrode a material layer for enhancing electron transport.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Pub 2003/0042850 to Bertrum et al., and further in view of US Pub 2003/0099860 to Lin et al.

Regarding claim 5 Bertrum discloses ([0023]-[0025]) different fluorescent transfer molecules such as perylene derivative, DCM, coumarine but does not exemplify selecting phosphorescing transfer molecules.

Lin in analogous art of organic EL device discloses (para [0033]) DCM, Coumarin, perylene or phosphorescent medium can be used as luminescent medium and hence these are recognized as art equivalents.

It would have been obvious to one of ordinary skill in the art at the time of invention to use phosphorescing transfer molecules as suggested by Lin instead of fluorescent transfer molecules of Bertrum since these are art recognized equivalents for luminescent material.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sikha Roy/  
Primary Examiner, Art Unit 2879

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